

# Maine Coastline

News from the Maine Coastal Program

Winter 2004



## Aquaculture

**SPECIAL REPORT**

*Diver Jason Prescott holds a 12-pound salmon raised at the Atlantic Salmon of Maine aquaculture site off Prescott Island in Machiasport.*

William Hubbell

## Seeking New Approaches to Planning and Development

Over the past three decades, Maine's marine aquaculture industry has grown from a handful of experimental farms into an industry with an estimated production value of \$57 million that employs 330 full-time workers (according to one recent economic analysis).

The rapid growth of aquaculture in Maine mirrors a broader global trend. Aquaculture is the world's fastest-growing food production sector, expanding by more than 10 percent a year. Already it supplies roughly one-third of all fish consumed.

Aquaculture provides a valuable source of protein and generates much-needed jobs in areas hard-hit by declines in traditional fisheries. "Total revenues from aquaculture represent only a small fraction of Maine's Gross State Product at present," says Sue Inches, Director of Industry Development at the Maine Department of Marine Resources (DMR), "but they could double in coming years according to an economic study that independent consultants recently prepared for the State." The coastal waters off midcoast and downeast Maine are well-suited to aquaculture in biophysical terms, and growers have a strong interest in expanding operations. The economic analysis found great potential for further culture of blue mussels and oysters, and possibilities for additional finfish farming.

To expand the scope and variety of its operations in Maine, the aquaculture industry will need to surmount obstacles that have constrained its growth to date: competition from other countries; insufficient research and development to support growers; regulatory uncertainty; and—most visibly—public concerns about the potential changes that can accompany aquaculture, a relative newcomer to Maine's waterfront.

Faced with more than a dozen bills concerning aquaculture practices last year, the Maine Legislature voted to establish a task force of knowledgeable citizens and an advisory group of stakeholders who could review the current planning and siting process and make recommendations for change. "The Aquaculture Task Force set about getting a comprehensive picture of what's working and what's not—through a series of six public meetings and several dozen presentations representing a real diversity of views," says Kathleen Leyden, Maine Coastal Program Director and a staff member to the Task Force. After six months of intensive work, the Task Force has released its recommendations. This expanded edition of *Maine Coastline* summarizes its findings, and offers background information on the practice of aquaculture in Maine.

*(continued on page 6)*





## Director's Column

January 2004

Marine waters constitute a rich and varied soup, teeming with life. That complexity and diversity is reflected, as well, among the stakeholders involved in marine affairs—fishermen, recreational boaters, shoreline business owners, waterfront home owners, municipal officials, aquacultural growers, scientists, sportsmen, regulators, and environmental groups. Each of these parties has distinct (and not always compatible) views on how the coast should look, and who should determine that. Since relatively new uses of marine waters generate the most conflict, it is not surprising to find heated dialogue about marine aquaculture.

This issue of *Maine Coastline* focuses on marine aquaculture in order to give readers a better understanding of the industry's current status and the work just completed by Governor Baldacci's Aquaculture Task Force. Through a grant to the Department of Marine Resources, the Maine Coastal Program supported the Task Force's seven-month investigation, including meetings, facilitation services, field trips, and presentations by experts from Ireland and Canada. That in-depth analysis resulted in a report (with a separate written response from designated stakeholders) that can be viewed on-line at <http://www.state.me.us/dmr/aquaculture/aqtaskforce/draftreport.htm>. I encourage you to read the entire document, but a short synopsis also appears on pages 4 and 5 of this newsletter.

The Legislature's Joint Standing Committee on Marine Resources will hear an informal presentation on the report in early February. The Committee *tentatively* has scheduled a public hearing for February 18, 2004 (at the Augusta Civic Center) on legislation recommended by the Task Force. Please check the Legislature's home page (<http://www.maine.gov/portal/government/legislature.html>) to confirm that date and get more information. You can follow the progress of any pending legislation through this web page as well.

The ongoing dialogue on aquaculture represents a fascinating case study in marine policy. As this process moves forward, the Coastal Program will seek to shape appropriate State policies and processes, and support local and regional organizations that are planning thoughtfully for the use of coastal waters. Ultimately, the quality of the marine policy "soup" we create in Maine will depend on the contributions of many chefs: I hope that during this winter and spring you'll consider sharing your thoughts with Legislators on the best ways to manage multiple marine uses.

Kathleen Leyden  
Maine Coastal Program Director

## Maine Coastline

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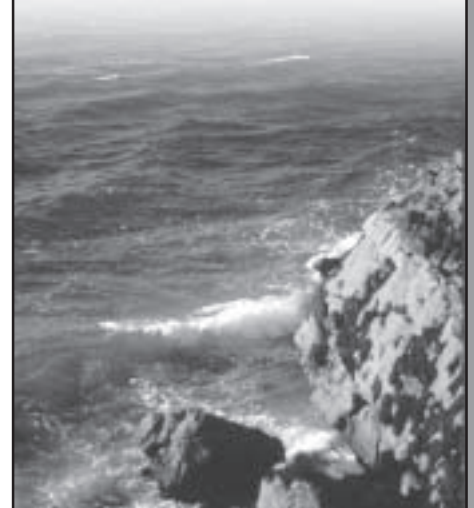
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# An Overview of Marine Aquaculture in Maine

Aquaculture in Maine involves both finfish and shellfish, with Atlantic salmon accounting for about 95 percent of the industry's total value. As of 2003, Maine had 21 active lease sites for salmon farming and about 42 for shellfish culture. Although the total aquaculture lease acreage statewide is almost 1,200 acres, less than 10 percent of that is used for cages and gear. The remainder provides anchor scope and allows growers room to move equipment seasonally to accommodate wildlife and visual concerns. In addition to the farm sites, there are 11 aquaculture hatcheries in Maine (five for salmon smolt and six for shellfish seed) and one active processing facility.

**Atlantic Salmon** farming in Maine began on a small scale in the 1970s and 1980s, with the size and number of operations increasing markedly in the 1990s. Over time, due to the economics of larger-scale operations, the industry consolidated down to three foreign-based corporations and one small operator raising salmon between Blue Hill Bay and Eastport. Approximately 225 full-time employees now work for these companies.

Farm workers transfer the salmon as juveniles from freshwater hatcheries to floating pens in coastal embayments where the fish are reared to market size (in roughly 30 months). Large pens can contain up to 40,000 salmon, and a lease site may hold more than half a million fish. Workers feed the fish pellets on computerized schedules and monitor the feeding using underwater cameras. This practice has increased feed conversion efficiencies and minimized environmental impacts on the bottom. Advances in vaccinations have greatly reduced the need for antibiotics, and most operations have not used them in recent years.

Salmon production peaked in 2000 at 36 million pounds, declining to about 8 million today due to an uncertain regulatory environment; a severe winter in 2001/2002; an outbreak of infectious salmon anemia (a viral disease that caused destruction of 1.5 million fish in January 2002); and a controversial court order in May 2003 that required fallowing for 2-3 years and designation of wild salmon as federally endangered (which required removal of non-North American strains of Atlantic salmon). Prospects for continued

salmon farming in Maine are uncertain as growing global demand supports expanding production in Chile, Europe and Canada.

**Blue Mussels**, first harvested in Maine in the 1970s, now are grown at sixteen lease sites. Most of these sites are held by small-scale, locally owned family businesses. Most mussel culture is still done by locating wild "seed" mussels onto appropriate bottom areas. Some growers have gotten good results raising mussels on vertical lines suspended from rafts, but this method is labor-intensive, has higher entry costs, and is more visible than operations conducted on the bottom. In both cases, the mussels eat plankton and organic matter in the water, receiving no feeds or additives. Mussels (and other farmed shellfish) require clean water and clean it further through filtering. Mussels typically reach market size

in 18 to 24 months. Domestic consumption of mussels has doubled since 1998, and producers in Maine are optimistic that demand will continue to increase. A recent economic assessment commissioned by the Department of Marine Resources (DMR) concluded that mussel rafts can generate a good rate of return, and there are many suitable locations for expanded harvesting. However, some coastal areas are polluted and are closed to shellfish aquaculture.

**American Oysters** are grown at 26 sites, mostly in midcoast estuaries. Oysters have been farmed successfully in Maine since

the 1970s, and there are reliable sources of seed oysters and relatively low entry costs.

Oysters are grown using a diversity of techniques, some that involve traditional bottom culture and some that involve suspended bags, cages or floating trays.

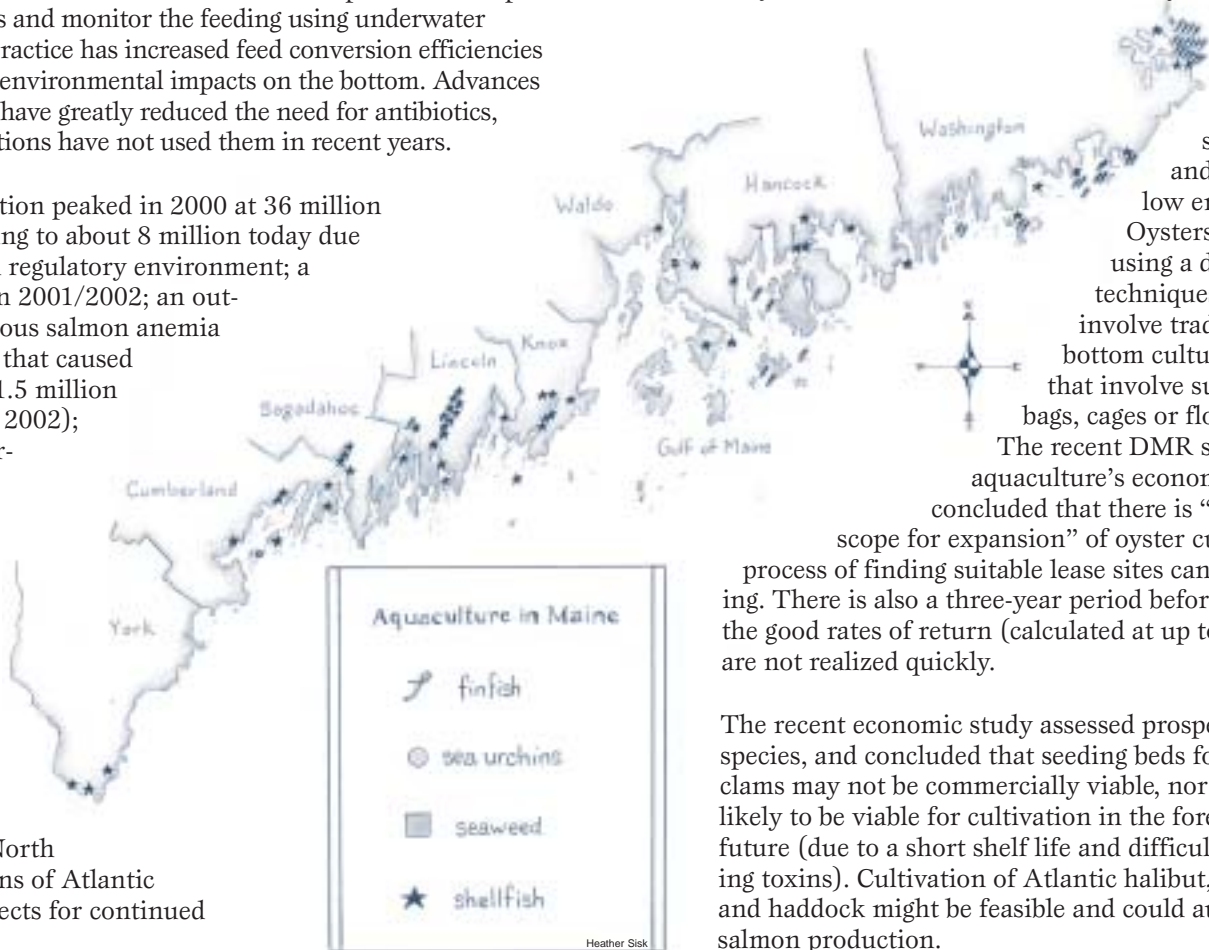
The recent DMR study on aquaculture's economic viability concluded that there is "considerable scope for expansion" of oyster culture, but the process of finding suitable lease sites can be challenging. There is also a three-year period before harvest so the good rates of return (calculated at up to 30 percent) are not realized quickly.

The recent economic study assessed prospects for other species, and concluded that seeding beds for soft-shell clams may not be commercially viable, nor are scallops likely to be viable for cultivation in the foreseeable future (due to a short shelf life and difficulties monitoring toxins). Cultivation of Atlantic halibut, Atlantic cod and haddock might be feasible and could augment salmon production.



Approximately 330 full-time employees now work in Maine's aquaculture industry.

Chris Barrett/Maine Sea Grant/UMCE



Heather Sisk



# Selected Recommendations from the Aquaculture Task Force Report

Please note: the following list highlights some recommendations from the Task Force Report. To view the full report, see <http://www.state.me.us/dmr/aquaculture/aqtaskforce/aqtfhomepage.htm> or call Deirdre Gilbert at 207-624-6576.

## Authority and Decision-making on Leases

- ◆ The Department of Marine Resources (DMR) should continue to base its formal aquaculture leasing process on the Administrative Procedures Act.
- ◆ The State should retain jurisdiction over leasing in subtidal areas.
- ◆ The DMR Commissioner should continue to make final lease decisions.

## Aquaculture Leasing Statute

- ◆ Require that DMR consider the number and density of all aquaculture leases in an area when evaluating a proposed lease.
- ◆ Increase the maximum lease acreage from 250 to 500 acres (to allow for more finfish fallowing).
- ◆ Include in decision criteria “conserved lands” owned by federal, state, or municipal governments or protected through fee ownership or conservation easement with funding from the Land for Maine’s Future Program. The DMR should adopt regulations that provide standards for assessing the impact of the proposed lease on public use and enjoyment of conserved lands within 1,000 feet of the site.
- ◆ DMR should create regulations that specify mitigation measures for noise and light and limitations on height, size, mass and color of buildings and equipment.

## Participation during the Leasing Process

- ◆ Require that the pre-application meeting between the applicant and the DMR (currently held at the DMR lab in Boothbay Harbor) be held in the municipality where the lease is proposed and include the harbormaster and/or a municipal official.
- ◆ Require a pre-application scoping session enabling an informal informational exchange among the applicant, riparian owners, town officials and other stakeholders before a formal application is submitted. A scoping session is also recommended for lease transfers, lease renewals and experimental leases.

## Municipal Involvement

- ◆ Allow a municipality to recommend that the DMR Commissioner establish certain conditions on a proposed lease, and require DMR to consider any conditions recommended (providing a written explanation to the municipality if a condition is not imposed).
- ◆ Clarify that municipalities do not have the authority to determine the location of moorings associated with aquaculture lease sites, or to charge mooring fees within the boundaries of aquaculture leases.



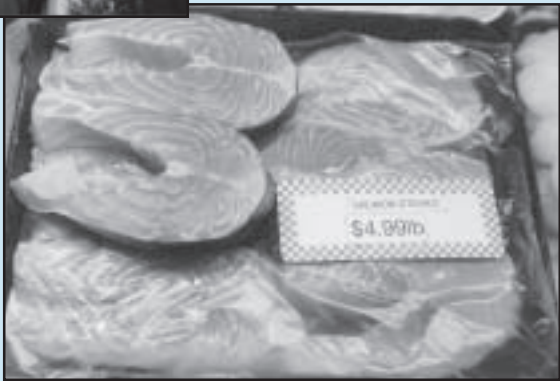
Chris Bartlett/Maine Sea Grant/UMCE



John Sowles/Maine DMR



Chris Bartlett/Maine Sea Grant/UMCE



Headwaters

## Ecological Health

- ◆ Eliminate the established time period of April 1st to Nov. 15th within which the DMR may conduct its site visit for aquaculture lease applications. Flexibility in timing will allow staff to evaluate flora and fauna at optimum times (ones that would reveal conflicting uses or the site’s ecological significance).
- ◆ DMR should explore incentives in the leasing process for use of methods such as polyculture that could reduce nutrient enrichment.
- ◆ The Legislature should charge the Department of Environmental Protection to review discharge permits governing marine waters to ensure that cumulative impacts from all sources to the receiving water are considered.

## Bay Management

- ◆ The Legislature should charge DMR with convening a group to study bay management (specifically how best to define bay management; and whether this concept can meet the needs of Maine people). In this process, the group should use the values and information collected, discussed, and debated by the Task Force.

## Overhaul Fee Structure

- ◆ Assess a reasonable fee for renewal and transfer applications. Establish a schedule of penalties for lease violations.
- ◆ Establish a tiered rental fee system in which rental fees correlate with the type of activity and the lease size. The tiered system should create incentives for remaining under a certain acreage.

## DMR Activities

- ◆ Move activities related to aquaculture industry development from DMR to the Department of Economic and Community Development (DECD) and those related to aquaculture promotion to the Department of Agriculture.
- ◆ Support more funding for enforcement.

## Resolution of Disputes Outside of Court

- ◆ To encourage conflict resolution outside the formal lease process, DMR should identify mediation resources, provide that list to all parties involved in lease-related conflicts, and update the list annually.

## Research

- ◆ DMR and the University of Maine should convene a group of research organizations and industry representatives and relevant non-governmental organizations to set priorities for aquaculture research (i.e., determining which species have the greatest development potential and merit most research), and to access bond funds for aquaculture research.

## Information

- ◆ DMR should continue to work pro-actively to inform the public about the lease process so as to make it less intimidating.
- ◆ Convene appropriate organizations to help identify areas where public information is needed and develop a plan that addresses those needs (e.g., regulatory, environmental concerns, legislative actions, industry publicity, K-12 Education, university education).

## Task Force Members

- Paul Anderson** (chair)  
University of Maine Sea Grant Program
- Brian Beal**  
University of Maine at Machias
- Jim Dow**  
Blue Hill Heritage Trust
- Des Fitzgerald**  
Founder of Ducktrap River Fish Farm
- Paul Frinsko, Esq.**  
Maine Atlantic Salmon Commission
- Anne Hayden**  
Resource Services, Inc.
- Will Hopkins**  
Cobscook Bay Resource Center
- Donald Perkins**  
Gulf of Maine Research Institute
- Van Perry**  
formerly of Finance Authority of Maine
- Josie Quintrell**  
Gulf of Maine Ocean Observing System
- Jim Salisbury**  
retired CEO of Supreme Alaska Seafood

## Stakeholder Advisory Panel

- Rob Bauer**  
Maine’s Best Seafood (shellfish aquaculture industry representative [large company])
- Sebastian Belle**  
Maine Aquaculture Association (finfish aquaculture industry representative [large company])
- Roger Fleming**  
Conservation Law Foundation (environmental field representative)
- Rich Knox**  
Maine Coast Heritage Trust (land conservation field representative)
- Eric Horne**  
Chance Along Farm (shellfish aquaculture industry representative [small company])
- Patrick Keliher**  
Coastal Conservation Association (commercial recreation industry representative)
- Carolyn Manson**  
Maine Tourism Association (tourism industry representative)
- Tom Morris**  
Morris Yachts (marine industry representative)
- Dave Schmanska**  
Harbormaster, Town of St. George (coastal municipality representative)
- Erick Swanson**  
Trumpet Island Salmon Farm (finfish aquaculture industry representative [small company])
- David Turner**  
Perry (Maine fishing industry representative)

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**Sue Inches**, DMR  
**Kathleen Leyden**, MCP  
**John Sowles**, DMR



## Waters in Trust for the Public Benefit

The political foment surrounding aquaculture derives in part from different interpretations of the legal framework that governs Maine's navigable waters. Management of submerged lands falls under the "Public Trust doctrine," which holds that all tidal and navigable waters, the lands beneath them and the living resources within them are owned by the State in trust for the public benefit.

In Maine, any exclusive use of submerged lands that involves structures or fixed gear requires a lease from the State. In the case of proposed aquaculture farms, the Department of Marine Resources (DMR) has a leasing process designed to ensure that these private operations serve the public interest in areas such as navigation, commerce, resource management and protection of existing public uses. This review process has come under fire in recent years, though, as aquaculture has expanded into more populous settings along the coast.

## The Current Lease Process

The State issues two kinds of leases: "standard" leases granted for up to 10 years (with an option to renew) on sites up to 100 acres; and "experimental" leases that last 3 years, cover no more than 2 acres, and cannot be renewed. When DMR receives an aquaculture lease application, agency staff visit the proposed site, document conditions, and gather information from the local harbormaster, residents, professionals and other agency staff about current and historic uses of the area. The Department sends copies of the application to the local harbormaster, the Army Corps, the Maine Department of Inland Fisheries and Wildlife and all waterfront landowners within 1,000 feet of the proposed lease site.

For standard sites (and upon request for experimental ones), DMR schedules a hearing. In recent years, Maine Sea Grant and Cooperative Extension have often hosted a pre-hearing informational meeting to help answer general questions of community members.

"The application and hearing process are designed to assess whether the proposed lease meets certain statutory criteria," explains Deirdre Gilbert, Special Assistant to the Commissioner at DMR. Those criteria concern navigation; the coming and going of nearby riparian landowners; fishing and other uses (including aquaculture) in the vicinity; the ability of the site and surrounding area to support ecologically significant species; and

the presence of public parks and facilities within 1,000 feet of the proposed site. "The passage of LD 1417 in the Spring of 2003," Gilbert notes, "added two more criteria: 'unreasonable impact from noise and light at the boundaries of the lease site' and compliance with rules that the DMR Commissioner will adopt concerning a farm's visual impact (relating to its color, height, shape and mass)."

Following DMR's hearing, the aquaculture hearings officer writes a draft decision that is reviewed by the applicant, any "intervenor" in the process (parties who have legally filed for such status, claiming a direct and substantial impact from the project), and the Attorney General's office. The final lease decision is then affirmed, modified or rejected by the Commissioner of Marine Resources.

The decision criteria do not account for all the possible impacts of an aquaculture operation

(such as the potential impact on adjacent conservation lands) or potential ecological issues (such as the inadvertent release of farmed fish). However, some concerns are addressed through environmental regulations and monitoring and some through negotiated agreements between the aquaculture grower and

## Creating a More Participatory Process

Objections to aquaculture leases have come from many quarters in recent years—including local fishermen, environmentalists, harbor committees, land conservationists, and seasonal and year-round residents with shorefront properties. What tends to unite these diverse opponents is a concern with being disenfranchised from a process that strongly affects their interests. They want communities and affected residents to have a stronger voice in the decision-making process.

While the State has jurisdiction over near-shore waters and submerged lands, some aspects of "in the water" activities (such as harbor management) are delegated to towns by statute. Dave Schmanska, a member of the Task Force's Stakeholder Advisory Group and a harbormaster in St. George, notes that Maine has repeatedly affirmed its commitment to a strong state and municipal partnerships. The leasing process, he believes, should reflect the fact that "townspeople have extensive knowledge of their local waters, and a deep, historic connection to their working waterfronts."

Recognizing the limitations of the current leasing process and the need for greater community involvement, the Task Force set out to create what it termed "a planning and regulatory process [that] is adaptive, inclusive and fair," and supports the growth of the industry in an economically and ecologically sustainable way. Whether their recommendations meet these ambitious goals will be the subject of public debate in coming months. Their recommendations have been delivered to the Marine Resources Committee and will be discussed in hearings later this winter. To participate in that Legislative forum, please monitor the Legislature's schedule (at <http://janus.state.me.us/house/schedule.htm>) or contact the Committee clerk Chris Harris (at 207-287-1337 or [Christopher.Harris@legislature.maine.gov](mailto:Christopher.Harris@legislature.maine.gov)) for more information.



community members. These agreements have addressed such issues as industry codes of practices, other state and federal laws regarding fish marking and containment, water quality monitoring, and the movement of fish and shellfish between different areas.

Others concerns remain unresolved, leading to the divergent perspectives represented in the following chart:



A large steel cage system supports a farm in Eastport's Prince Cove.

## Alternative Perspectives on Aquaculture Issues

| Issue  | Point  | Counterpoint  |
|--|--|---|
| <i>Noise and Lights from Farming Operations</i>                                      | Fish farms generate lighting and noise that can be disruptive to riparian landowners.  | Where light and noise have been a concern, conditions have been imposed on leases. Recent statutory changes are also aimed at addressing these concerns.                  |
| <i>Impacts on Conserved Land and Scenic Character</i>                                | The present standard does not address impacts more than 1,000 feet from the site and fails to account for the public benefits derived from privately held conservation lands.                        | No other structural developments on land or water must account for impacts on conserved lands in the vicinity.  |
| <i>Structures and Buildings that are Visually Incompatible with the Surroundings</i> | Aquaculture structures may not be in keeping with others nearby (due to size or color) or may be situated in a pristine natural area.  | Working structures along the waterfront should not be subject to aesthetic considerations.  |
| <i>Impact on Wild Fish Species</i>   | The presence of fish farms can change habitats and disrupt species beyond the immediate vicinity of the farm. Inadvertent release of farmed fish can lead to harmful cross-breeding with wild stock. | Despite monitoring, there are no examples in Maine of disruption beyond the immediate site.   |
| <i>Introduction of Non-native Species</i>  | Marine ecosystems can be harmed irreparably by the unintended introduction of non-native species that disrupt the existing species composition.  | To date, aquaculture in Maine has not produced an undesirable impact from introduced species. Any proposal to introduce a non-native species undergoes scientific review. |
| <i>Impacts on Wildlife and Habitat</i>   | Aquaculture farms can entangle birds and marine mammals and lead to the shooting of "nuisance animals" that disrupt pen operations.  | Farms can appropriately deter predator species like seals, cormorants and eiders through legally approved means.  |
| <i>Alteration of Bottom Habitat</i>  | Overenrichment from feed and feces beneath pens can smother bottom habitats, depleting oxygen and producing toxic hydrogen sulfide gas.  | Stringent requirements to protect this habitat are already in place with routine monitoring to ensure compliance.   |
| <i>Degradation of Water Quality</i>  | Nutrient enrichment and alteration of current patterns potentially can cause oxygen depletion, ammonia toxicity or algal growth.   | Waters are already closely tested and any temporary diminishment can be readily corrected and reversed.   |
| <i>Impacts on Traditional Fisheries</i>  | The presence of fish farms potentially could reduce the availability of other commercial species.  | Statutory criteria already favor traditional fisheries, and the amount of bottom leased for aquaculture is negligible in comparison.                                      |
| <i>Impacts on Tourism</i>  | The presence of aquaculture farms can diminish the aesthetic and recreational appeal of Maine's waterfront, reducing tourism revenues.   | Visitors do not make recreational decisions based on aquaculture farms, and the farms could generate new tourism opportunities.   |

(Thanks to Andrew Fisk, formerly Aquaculture Coordinator at DMR, for providing much of the content for this summary.)



# Open Ocean Aquaculture—The Wave of the Future?

If aquaculture farms were able to move offshore, they might experience fewer conflicts with shorefront users and find better water quality to meet growers' needs. Those lures are drawing researchers at the University of New Hampshire Open Ocean Aquaculture (OOA) Program to assess prospects for farming finfish and shellfish miles offshore.

"Many growers know that they're going to need to move offshore eventually," observes Dr. Richard Langan, a Project Manager with the OOA Program. "They're just not sure how to manage the transition, and there's a lot of research needed to meet the technical and engineering challenges posed by exposed ocean settings." High winds and waves can damage offshore farms, and the logistics of feeding and harvesting can be difficult. Researchers at the OOA Program hope to facilitate this transition in New England aquaculture by creating and testing designs and operations that can work at sea.

Since the program's launch in 1997, scientists have devised means for successfully cultivating blue mussels and the grow-out of market-sized summer flounder, halibut, cod and haddock. (The OOA Program has not attempted to grow salmon offshore because the fish need to surface periodically for air, and the pens designed for open ocean use are all submerged.)

"The technology is ready to go right now in terms of commercial application for shellfish," Langan says. Two fishermen's coops in New Hampshire are already working on applications for offshore mussel culture. A group of Maine fishermen also visited the offshore site (as part of a grant received by the Pemaquid Oyster



*Given the conflicts inherent in siting coastal aquaculture farms, researchers are exploring possibilities of farms sited offshore.*

University of New Hampshire Open Ocean Aquaculture Project

Company for retraining displaced fishermen), and several expressed interest in the longline technology.

Langan sees the launch of commercial shellfish ventures as a crucial next step in the development of offshore aquaculture. For finfish, there are two companies that are currently operating at a small scale, though not in the North Atlantic. "Until incubator companies expand and demonstrate that they can succeed offshore, it will be hard to get the private sector to invest more," he says. The commercial

operations already underway in Puerto Rico and Hawaii could provide valuable lessons for offshore growers in New England. This region's cold and stormy waters add extra challenges, though, Langan concedes: "we often say if we can do it in the Gulf of Maine, anyone can do it anywhere."

The prospects for finfish farming offshore will depend not only on the technological success of prototype farms but on the growth of "niche markets" for cultured fish. (One challenge will be to contain costs so as to compete with imported frozen sea fish from Iceland, Norway and other parts of the world.) Langan is optimistic that these markets will emerge because demand far exceeds supply for cold-water species like cod and haddock. "The national trade deficit for seafood was \$7 billion last year, and it just keeps going up and up," Langan notes. "It would be great to supply some of that demand with domestically farmed products and provide needed employment for those displaced from traditional fisheries."

*More information on the OOA Program is available at <http://oaa.unh.edu>.*



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The Maine Coastal Program represents a partnership of local, regional and state agencies that work collaboratively to enhance management of the state's diverse coastal resources. Housed at the State Planning Office, Coastal Program staff work extensively with governmental agencies and community organizations such as local land trusts and regional economic development groups. Planning and outreach focus on such issues as watershed management, development issues, fisheries management, water quality monitoring, marine education, citizen stewardship, coastal hazards, marine infrastructure and habitat protection.

For more information on the Maine Coastal Program, please visit our website at [www.maineoceanprogram.org](http://www.maineoceanprogram.org)

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